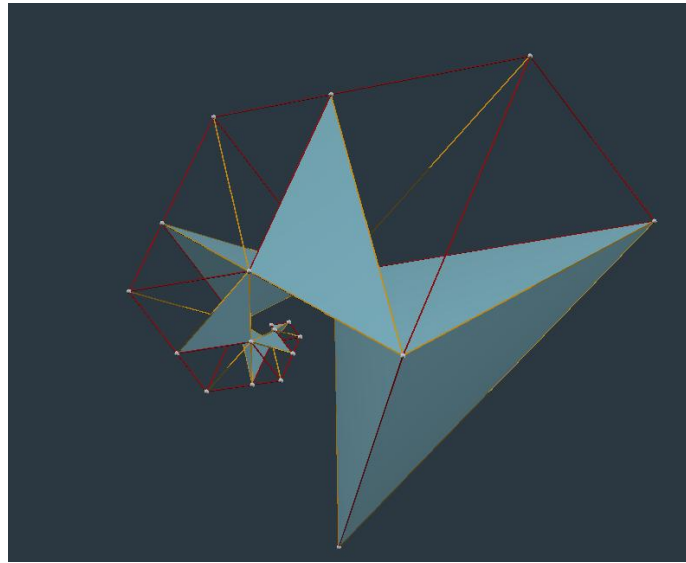


Python for Teachers



by Kirby Urner and crew

June 2009

☆ Python for Teachers

Excerpt

Bring your laptop with Python installed and follow along as we go through examples from a 21st century high school mathematics curriculum, such as we're currently prototyping and implementing in niche markets.

Description

Portland is at the cutting edge when it comes to pioneering a world class 21st century education for its students. [The Silicon Forest](#) is stepping up to the plate. Python plays a role in the action.

Starting with West Precinct, Hillsboro Police Department, [Saturday Academy](#) has been teaching FOSS concepts (free and open source software), later morphing into a more mainstream form of "Pythonic Math". Winterhaven (Portland Public, a "geek hogwarts") has also gotten in on the [pilot studies](#)

Kirby Urner, former math teacher and consultant to McGraw-Hill, veteran of OSCON, EuroPython and Pycon circuits, will give you the inside story on all of the above, having been an active player in helping Portland remain a "FOSS capital" ([Christian Science Monitor, 2005](#)). Kirby is a curriculum writer for [4D Solutions](#), also CMO for a FOSS project involving [coffee shops](#). He is also [an IEEE member](#) and past web wrangler for the Buckminster Fuller Institute ([BFI.org](#)).

Bring your laptop with Python installed and follow along as we go through examples from a 21st century high school mathematics curriculum, such as we're currently prototyping and implementing in niche markets.

ACCEPTED
SESSION

CULTURE

Long form

osb2009-0034

Scheduled:

Thursday, June 18,
2009 from 1:45 –
3:30pm in [Burnside](#)

Speaker

Kirby Urner

Website: <http://www.4dsolutions.net/>

Biography

Kirby moved to Portland from Chicago when his dad joined the Portland Planning Bureau, after which the family moved overseas to serve planning clients in Libya, Philippines, Egypt, Bangladesh, Bhutan and Lesotho.



Kirby attended Princeton University, focusing on the philosophy of Ludwig Wittgenstein for his thesis, while haunting the "E-Quad" (engineering quadrangle) for computer science courses, having fallen in love with APL (Princeton had scattered APL terminals, slaved to an IBM 370, throughout the campus).

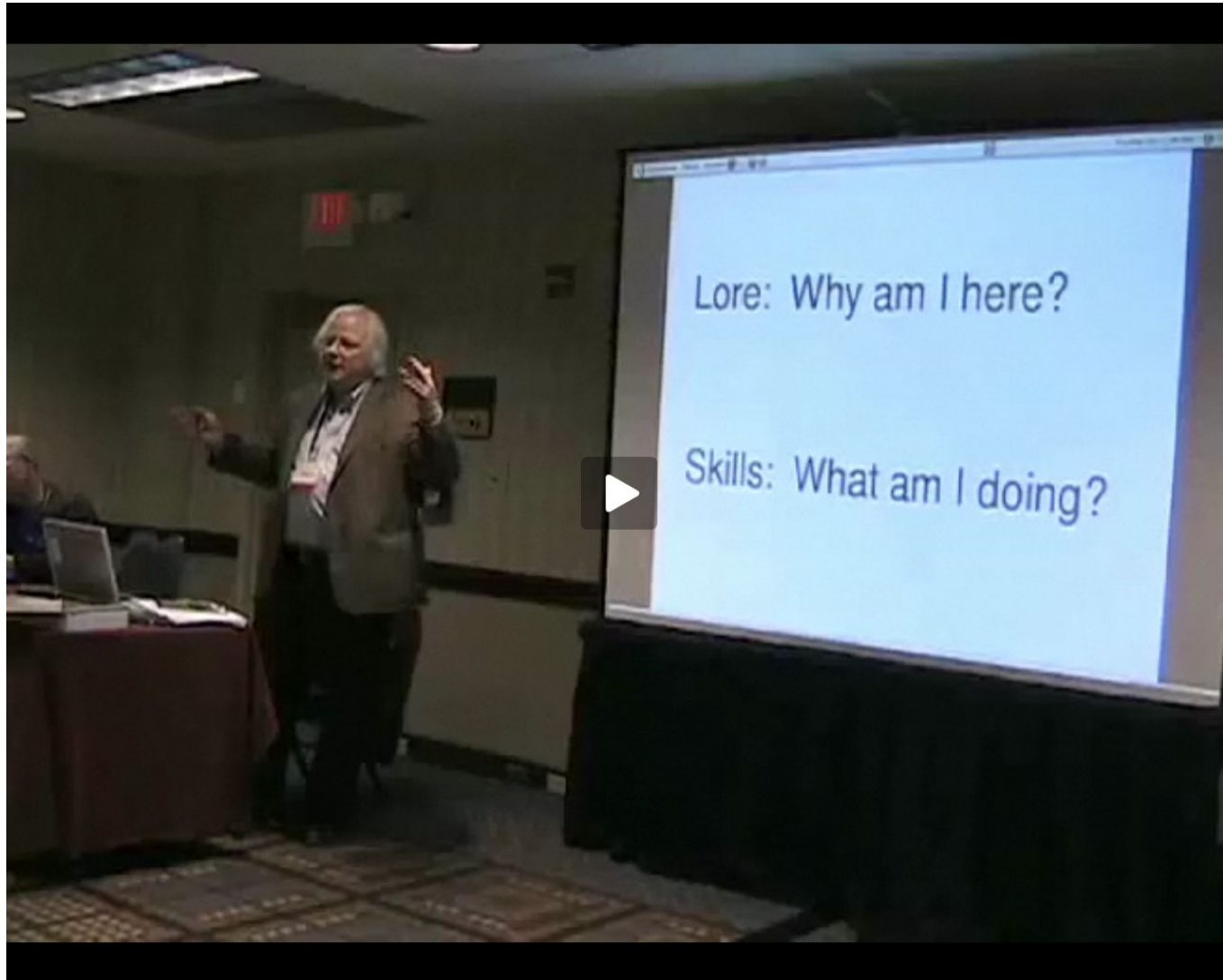
After serving as a mathematics teacher in an exclusive Catholic academy for young women, and as a contributing editor for computer literacy materials for McGraw-Hill in the 1980s, Kirby returned to Portland to pursue a career in programming in the not-for-profit sector, starting with Ecumenical Ministries of Oregon's Center for Urban Education, and later as an associate with Dawn Wicca & Associates (DWA).

Kirby's background in philosophy and computer science continued to inform his approach to education whereas the development of the Internet enabled him to discover his global team of peers, including within the Python community.

Sessions

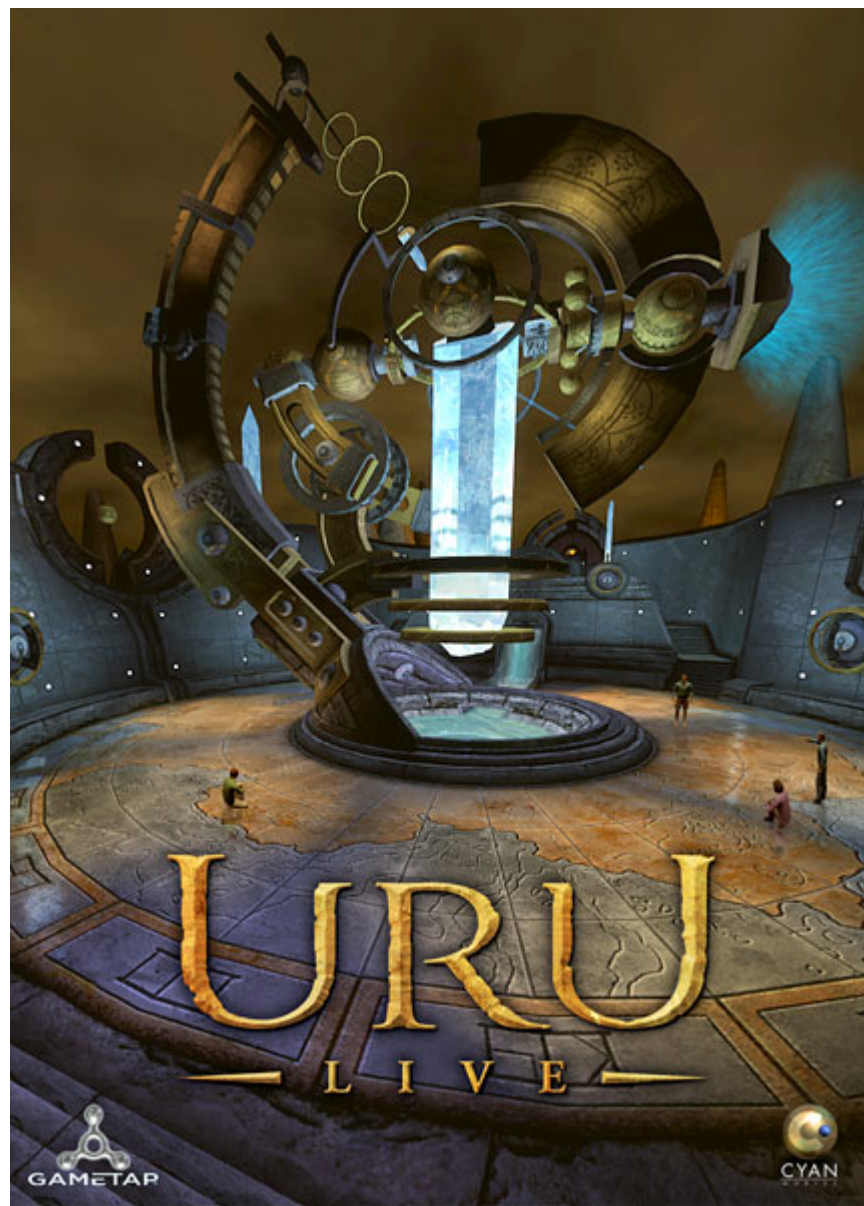
★ **Python for Teachers**

CORE QUESTIONS: KEEPING FOCUS



Lightning Talk Version

- [0] title and opening credits
- [1] the geography in question
(like a videogame, like *Uru* by Cyan of Spokane)
- [2] blasting a new track (Max tunnel metaphors)
- [3] light at the end of the tunnel
(sweet jobs in the Silicon Forest)
- [4] on the ground (math wars R us)
- [5] marketing strategies (private industry mulls 'em over)
- [6] quick trip through some math topics in Python (yawn)
- [7] recap of core strategies, "takeover" of PPS (willing recruits model, merit paid elite crew)
- [8] FOSS in Culture
(generic themes relevant to the conference)
- [9] closing credits, 4D Solutions logo



Where is Python Nation?

Guido: BDFL



... right next to
the Republic of Perl



Note Netherlands, quite near

Embedded in a FOSS context...

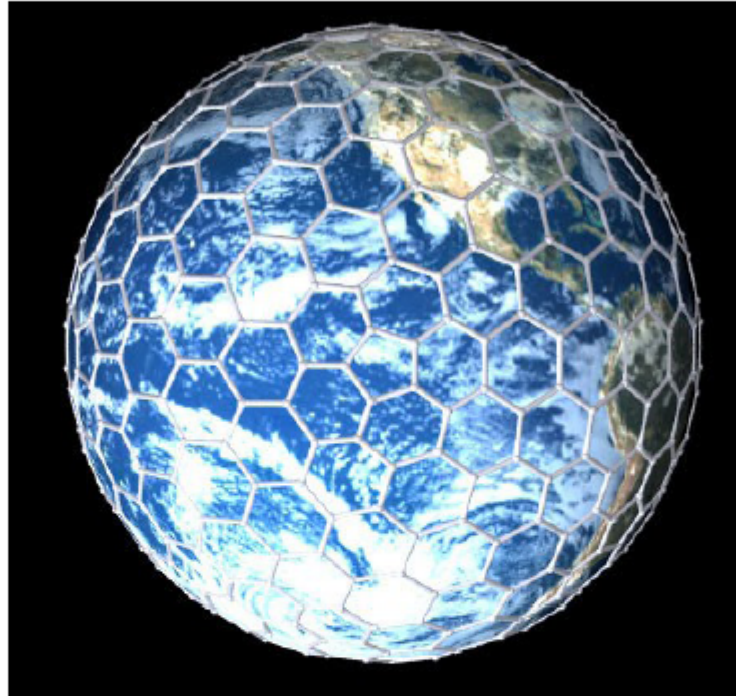


Webus Vancouverous



FOSS boss

Connecting the Dots

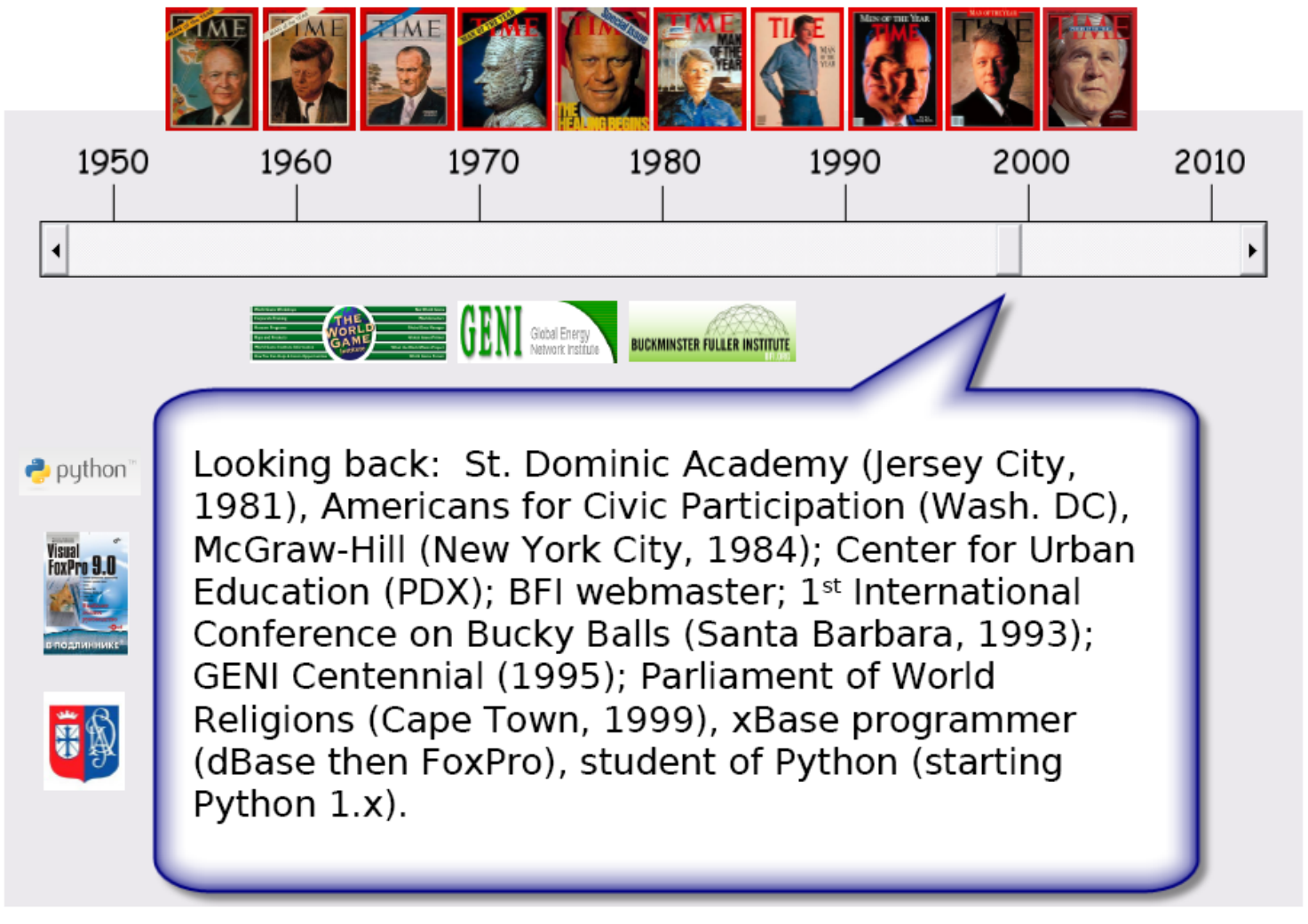


by Kirby Urner, 4D Solutions,
Summer of 2007



EuroPython 2007
9-11 July, 2007,
Vilnius, Lithuania



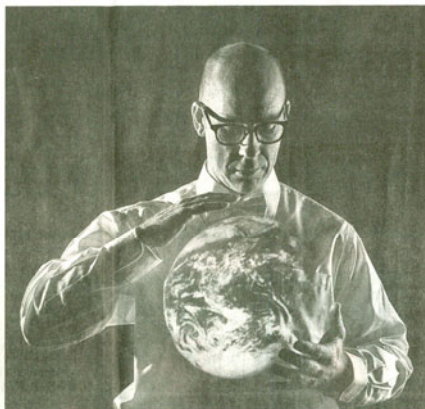
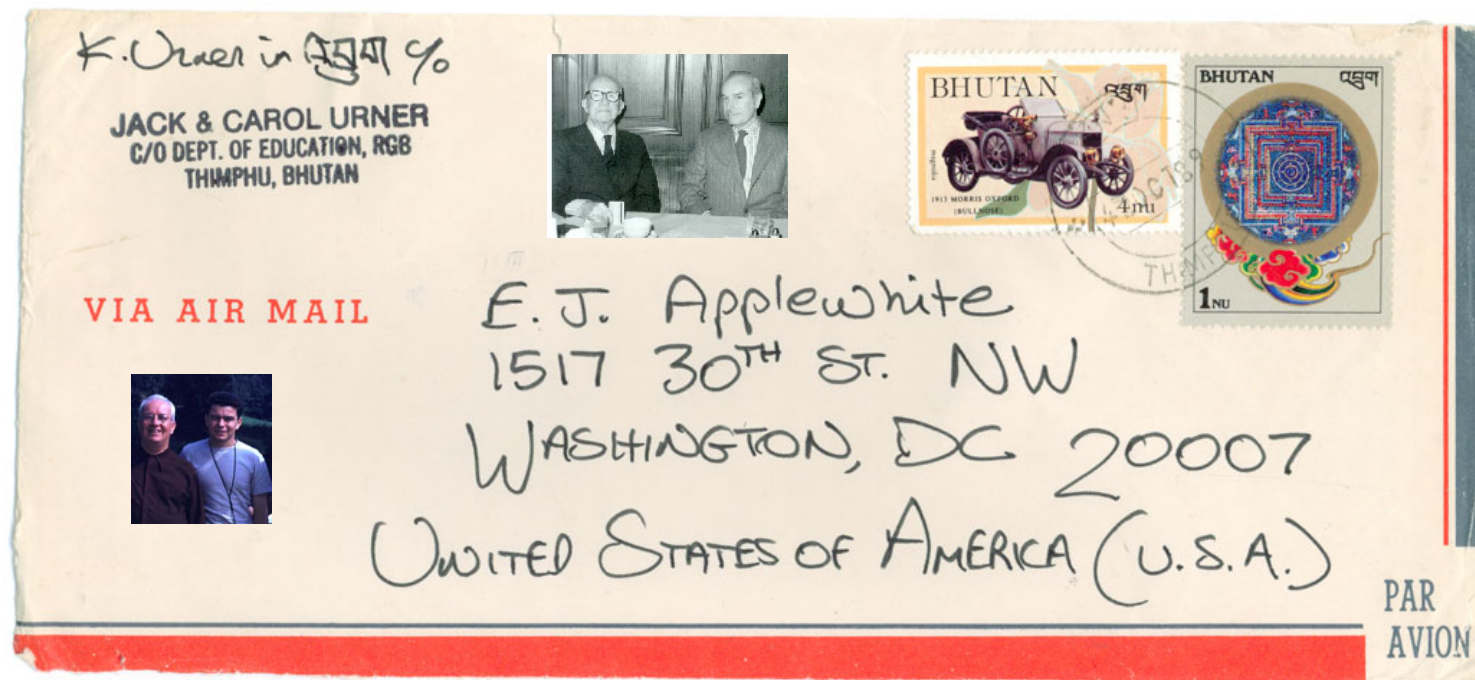


1950 1960 1970 1980 1990 2000 2010

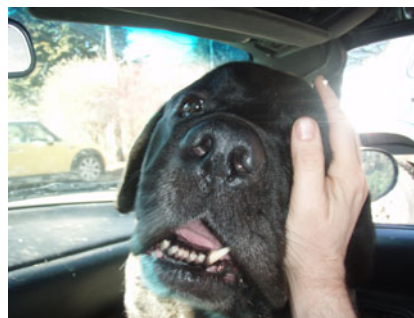
Looking back: St. Dominic Academy (Jersey City, 1981), Americans for Civic Participation (Wash. DC), McGraw-Hill (New York City, 1984); Center for Urban Education (PDX); BFI webmaster; 1st International Conference on Bucky Balls (Santa Barbara, 1993); GENI Centennial (1995); Parliament of World Religions (Cape Town, 1999), xBase programmer (dBase then FoxPro), student of Python (starting Python 1.x).

SUMMER OF 2007: Europython, Vilnius, Lithuania





OWEN CAREY
Doug Tompos is the title character in "R. Buckminster Fuller: The History (and Mystery) of the Universe," a one-man play at Portland Center Stage that captures the thinker's restless curiosity and playfulness.



Shomar: a Wanderer

Art and Engineering



Other
Bio...

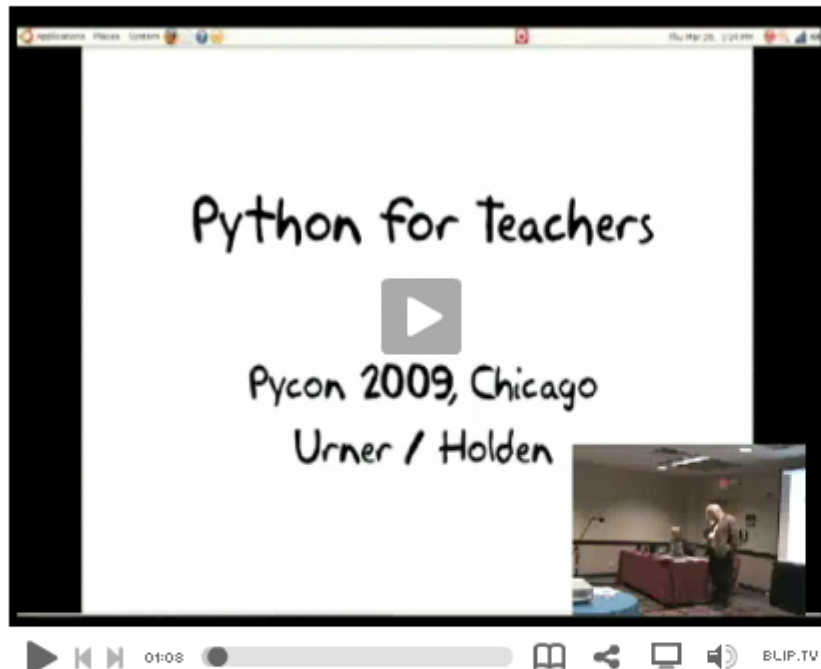


PYCON 2009: WORKSHOP FOR TEACHERS

Showing posts for query **Urner-Holden**. [Show all posts](#)

FRIDAY, MARCH 27, 2009

Urner-Holden Workshop Etc.



first 57 minutes

(may take time to download)

I was blessed with some deep thinking attenders, had a great A/V team (volunteers with yellow shirts, Pycon branding). Having field tested this talk a number of times, I have to say I was both prepared and not prepared.

WRITER / PROGRAMMER



K. Urner



LINKS

[Control Room](#)

[BizMo Diaries](#)

[Coffee Shops Network](#)

[4D Solutions](#)

[4D Studios @ Myspace](#)

[Grunch.net](#)

[Kirby on Facebook](#)

[Flickr Photostream \(thekirbster\)](#)



P4E in PDX

- 2004:

Adventures in Open Source (sa:); West Precinct, HPD;
J. Collord & K. Urner

- 2005 – 2006:

Python @ Winterhaven Public School; K. Urner



- 2005 – 2007:

Pythonic math courses (sa:); OGI, PSU; K. Urner



Saturday Academy: recruiting new Silicon Foresters

Lightning Talk Version

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(generic themes relevant to the conference)
- [9] closing credits, 4D Solutions logo

February 4, 2009 at 12:58 pm

Coyote on Portland's Max

by Andrew Smith

It's time for a smarter math track...

OK, not exactly a tunnel here, just a “smart student” riding our Max, a “digital math mascot.”



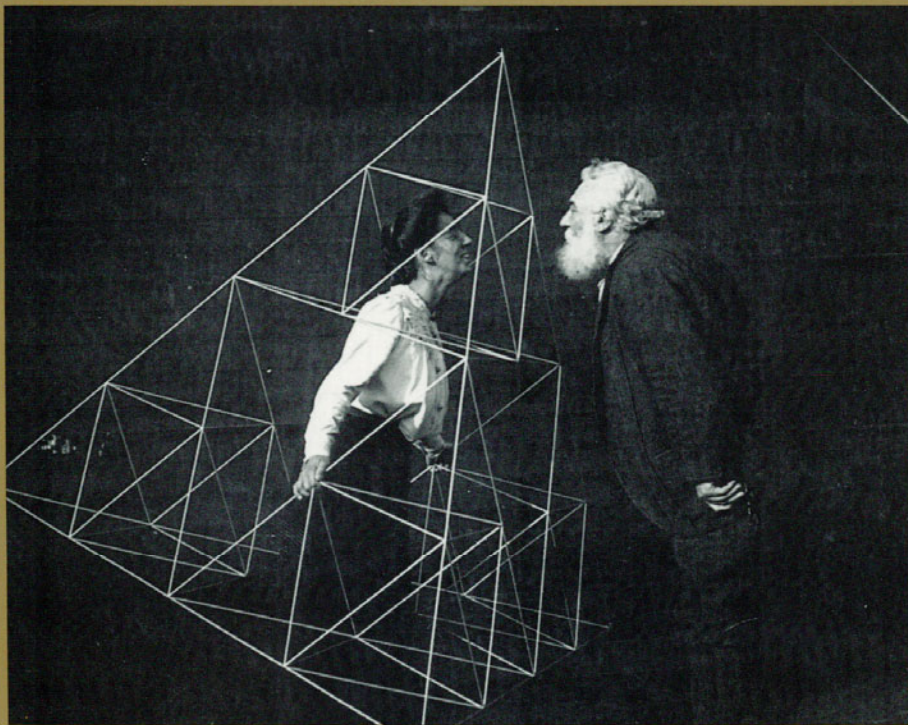
Coyote Academy

Friday, February 15, 2002

Wandering Coyote Booted from Airport Hops a Train Instead

GENIUS AT WORK

Images of Alexander Graham Bell

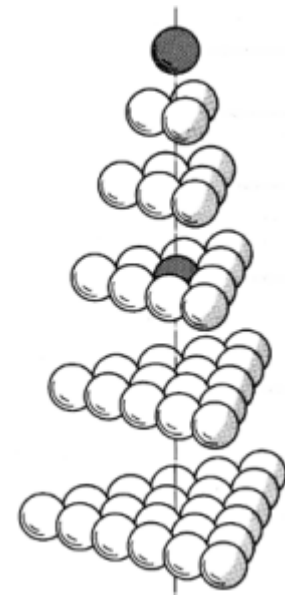


Dorothy Harley Eber
Prologue: R. Buckminster Fuller



follow your curiosity

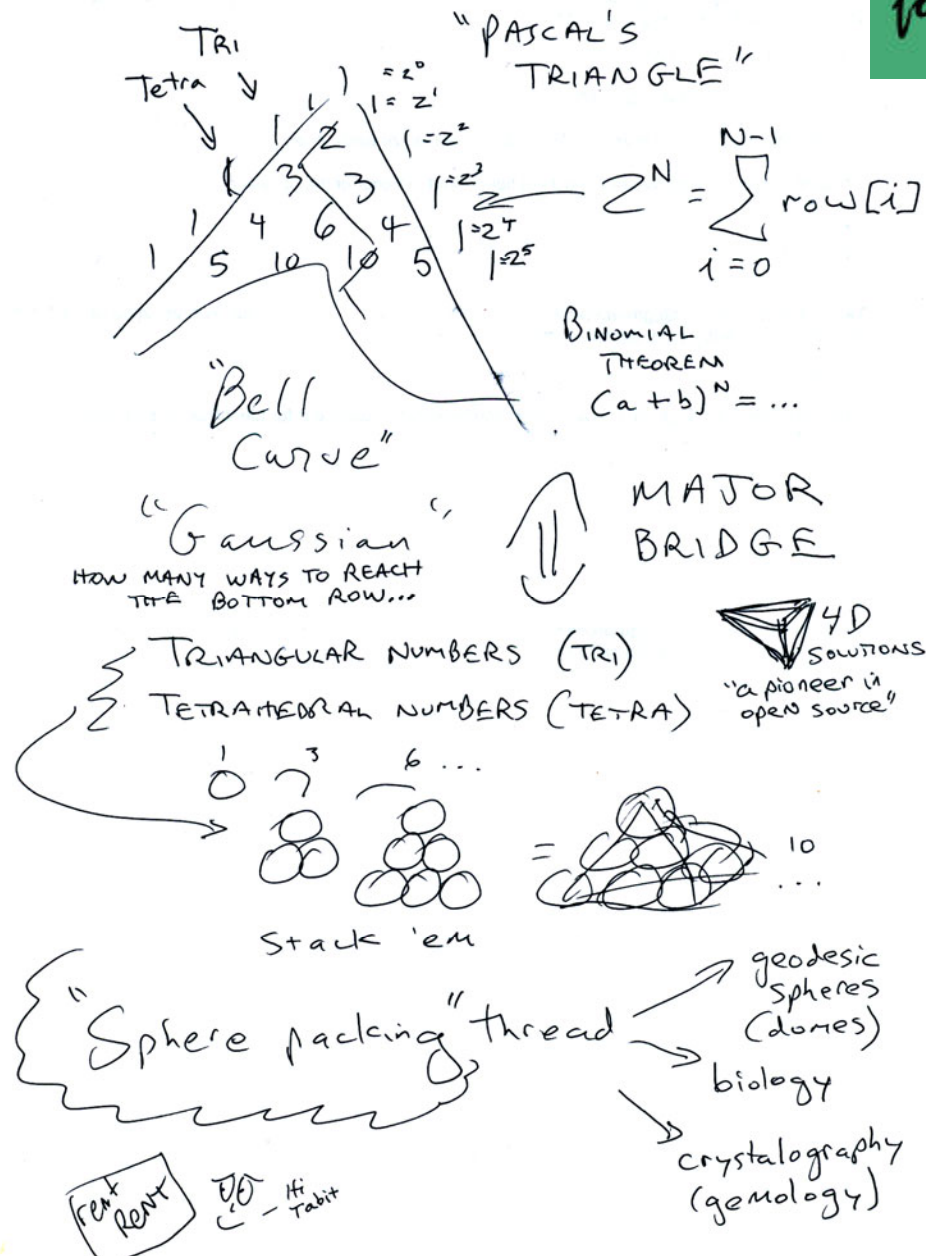
study your heritage



Pascal's Triangle and Sphere Packing: Designing a Bridge



follow your curiosity



Pascal's Triangle is a grand central station of converging math threads, including Binomial Theorem and Bell Curve statistics.

Another grand central is the sphere packing thread.

A bridge between them is the fact that triangular and tetrahedral numbers appear in Pascal's Triangle.

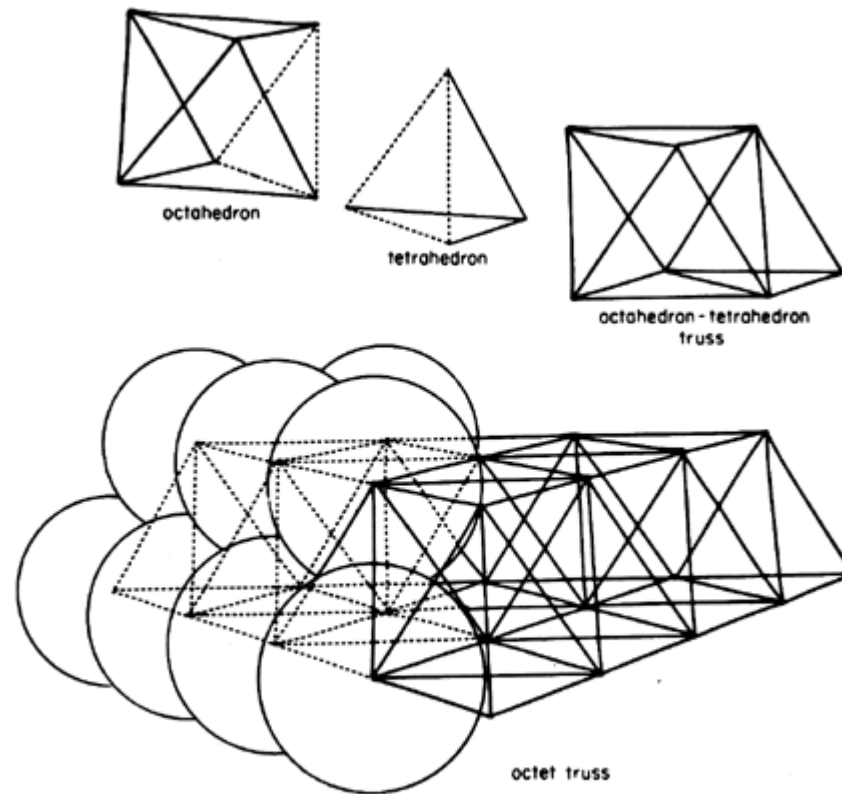


Fig. 420.01 Octet Truss.

From
*Synergetics:
Explorations
In the Geometry
Of Thinking*, by
R. Buckminster
Fuller

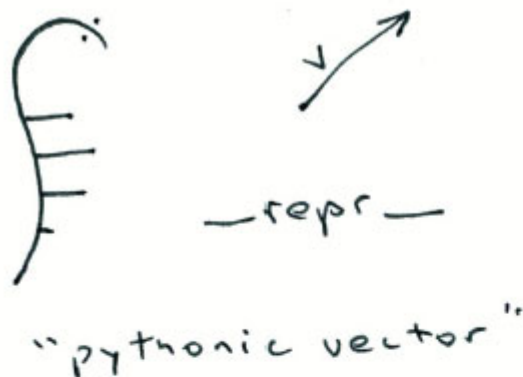
http://mathforum.org/workshops/usi/pascal/pascal_triangular.html

http://mathforum.org/workshops/usi/pascal/pascal_tetrahedral.html





A.



Useful multilingual mnemonic:
a Python has lots of `__ribs__`



```
class Snake (object) :
```

```
def __init__(self):
    # get born
    self.stomach = []
```

```
def __repr__(self):
    # represent self to world
    return "Snake at %s" % id(self)
```

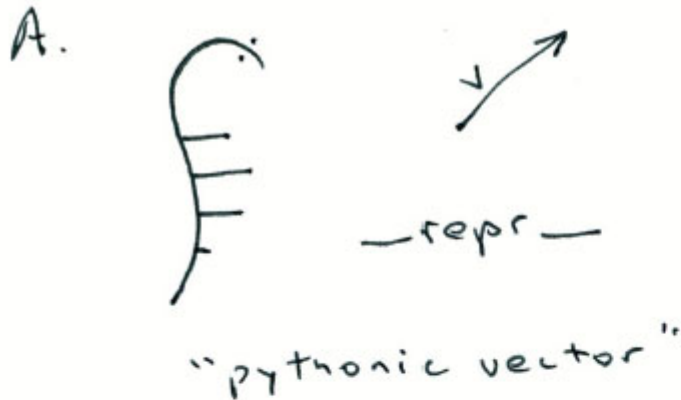
```
def __rib__(self):
    # any special name
    pass
```

```
def __rib__(self):
    # any special name
    pass
```

```
def eat(self, food):
    self.stomach.append(food)
```

```
def poop(self):
    # kids like scatological stuff
    # e.g. "grossology"
    if len(self.stomach)>0:
        self.stomach.pop(0) # FIFO
```





Multi-lingual mnemonic:
a Python has lots of `__ribs__`

```
>>> from europython2007 import Snake
>>> thesnake = Snake() # get born
>>> thesnake
Snake at 14000304
>>> thesnake.eat("mouse")
>>> thesnake.stomach
['mouse']
>>> thesnake.eat(thesnake) # uroboros
>>> thesnake.poop()
>>> thesnake.stomach
[Snake at 14000304]
>>>
```

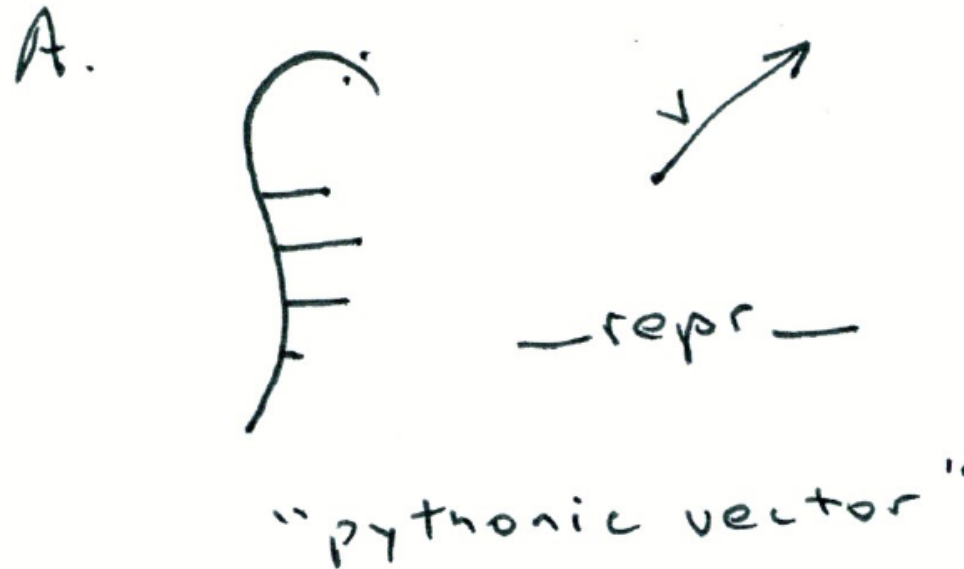


Python Bridge,
Amsterdam



Multi-cultural uroboros imagery

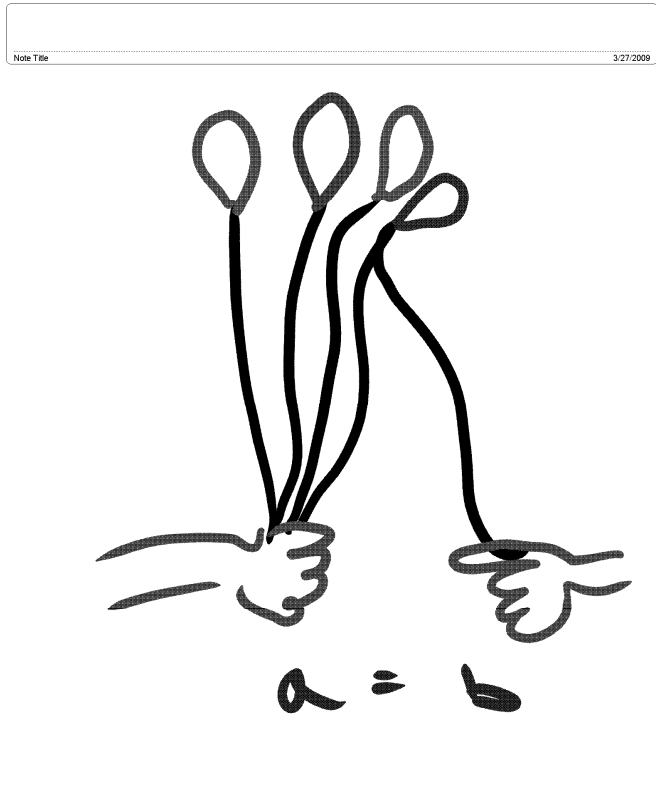
Everything is an object...



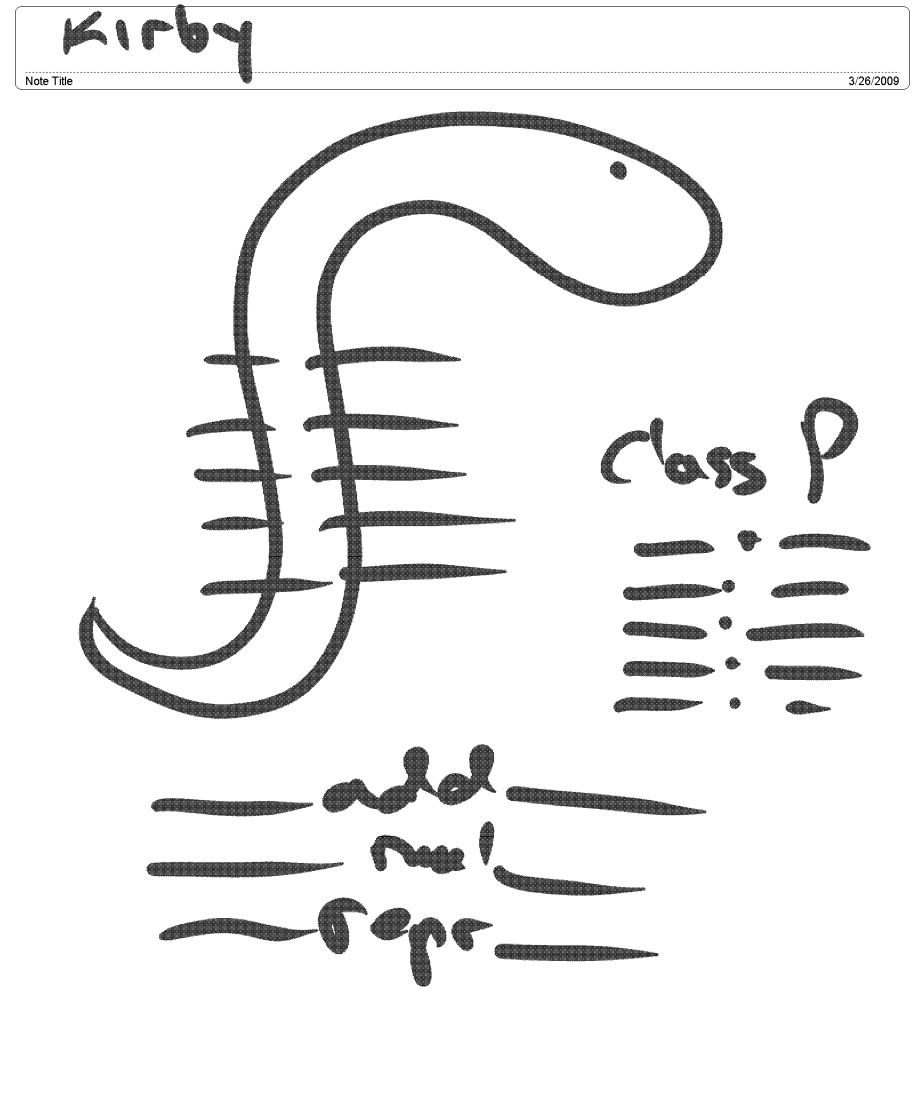
...including "math objects."

Like vectors, polynomials, polyhedra, fractals, factories...
permutations.

Math topics + object-oriented model = a new standard (one of many).

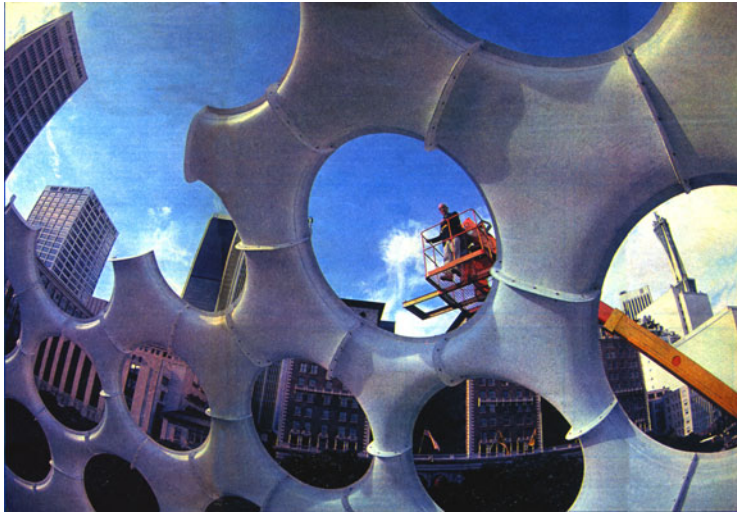


Sketches for PSF
chairman, Pycon 2009

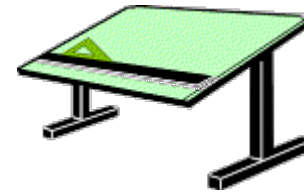
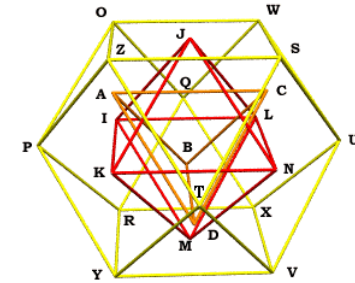


Lightning Talk Version

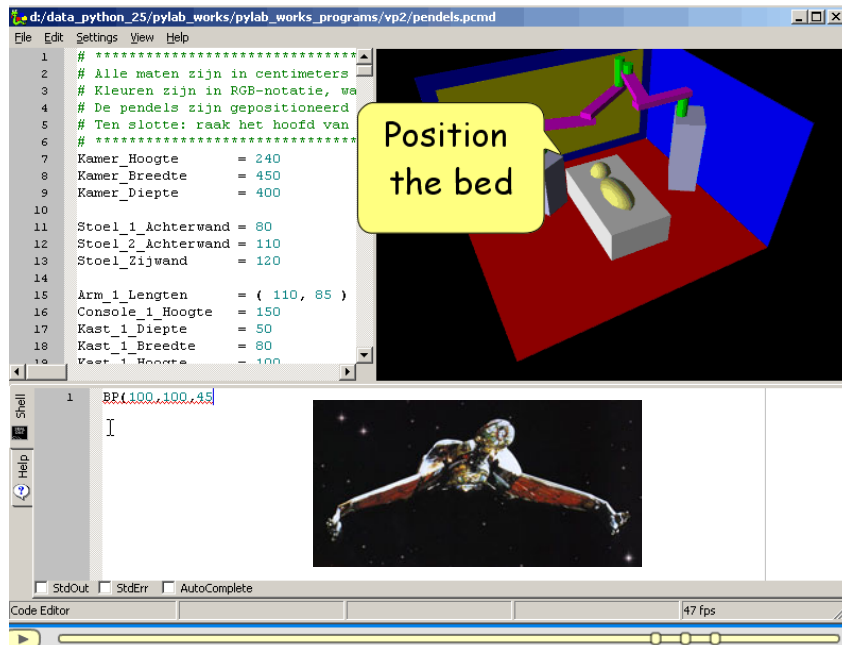
- [0] title and opening credits
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(generic themes relevant to the conference)
- [9] closing credits, 4D Solutions logo



URL
XP
XRL



storyboard



Lightning Talk Version

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But wait!

Don't we need this guy to make us all do the same thing?



NATIONAL CURRICULUM?

But what about Portlandia?



Spring of 2009, right after Pycon...



Vancouver, WA
is cool too



She has a boyfriend in
Gothenberg (Goth capital)

Lotsa FOSS bosses

EuroPython @ Chalmers 2005

Nano Tech (bucky tubes 'n balls)

HP4E (a meme campaign)

Guido's earlier CP4E (DARPA)

P4E (= programming + theater)

Shuttleworth Summit (London)

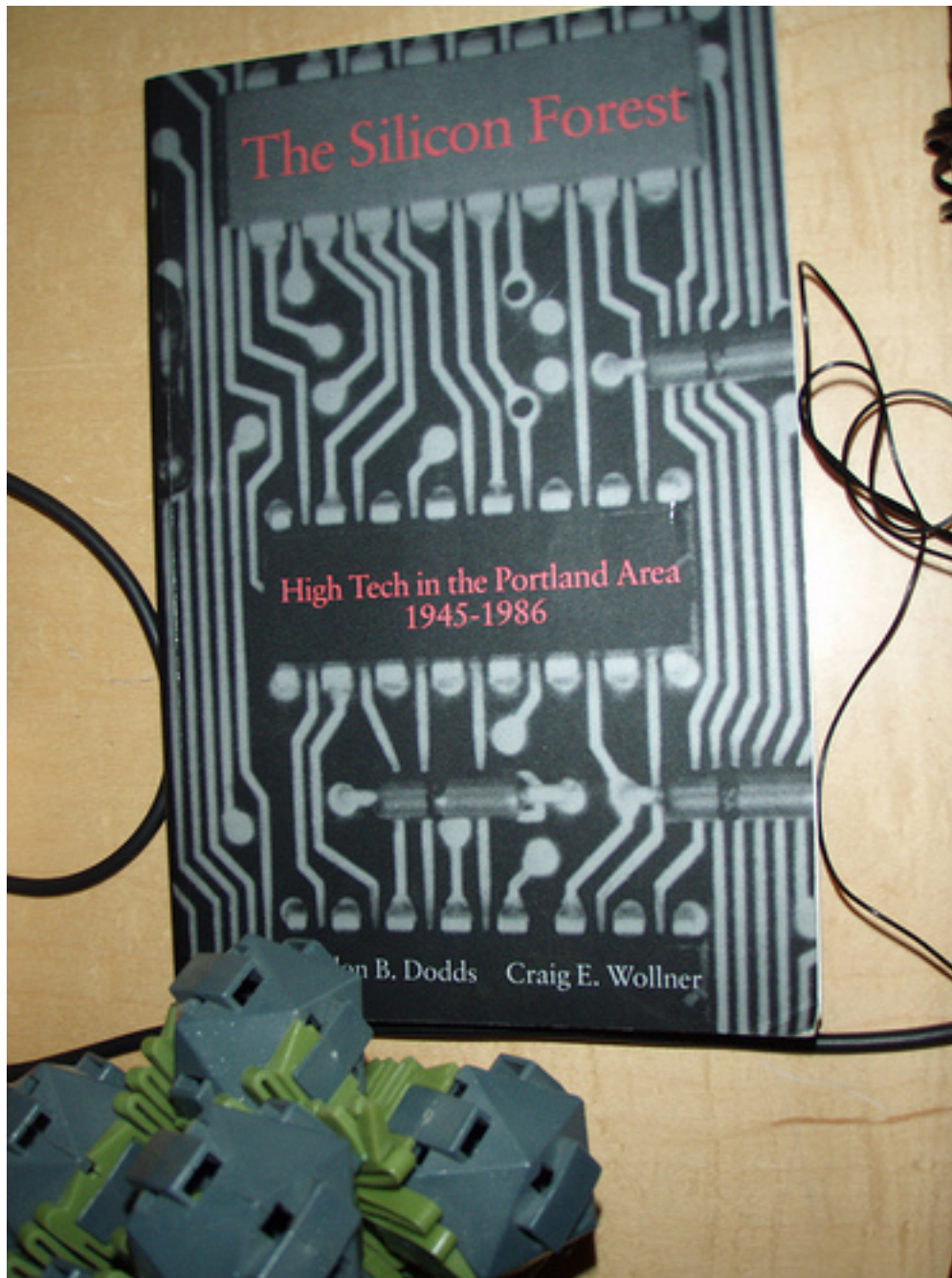
EuroPython @ CERN: Alan Kay

EuroPython @ Vilnius: more dots

Pycon @ Chicago (Bucky exhibit)

Lightning Talk Version

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Oregon's original "Silicon Forest" was on Portland's Southeast Hawthorne Boulevard, in Douglas Strain's company that eventually became Electro Scientific Industries and in Jack Murdock and Howard Vollum's appliance store that later became Tektronix. [pg. 10]

Athena's Friend

ADD NOTE SEND TO GROUP ADD TO SET BLOG THIS ALL SIZES ORDER PRINTS ROTATE EDIT PHOTO DELETE



Add your comment



How do I format my comment?

Share This

Uploaded on May 12, 2009
by [thekirbster](#)

thekirbster's photostream



5,594
uploads

browse

This photo also belongs to:

Fine Grind (Set)



66
items

browse

Friends of Jung (Set)



30
items

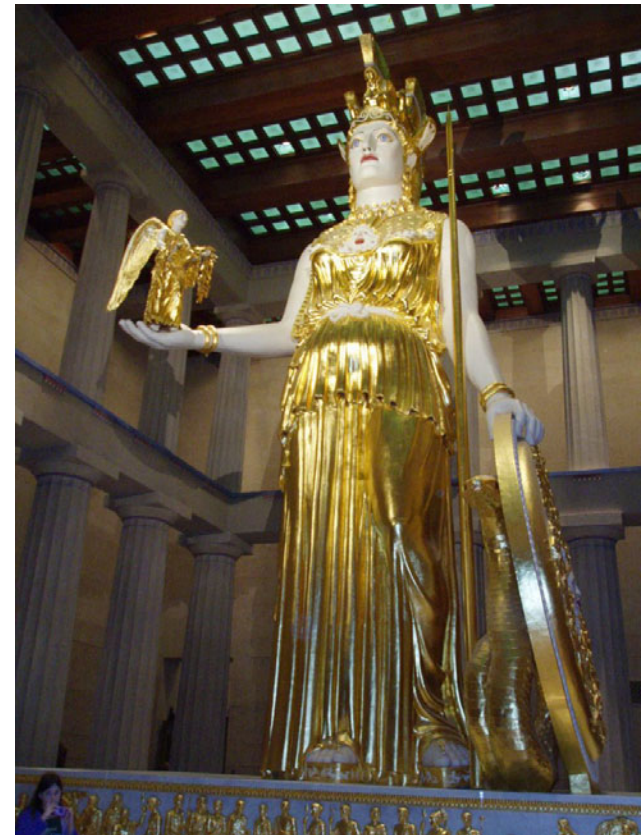
browse

Pycon 2009 (Set)



121
items

browse



“just use it”



Gxogle



Recruiting more XX FOSS bosses (per OSCON 2008)...

Socially Responsible Gaming...



... Coyote Academy, PKL, CSN ...

<http://worldgame.blogspot.com/2008/07/women-and-foss.html>

Planner



Nirel @work

CSN CTO



Free Rice...



Language games:

parlor games... (salon)

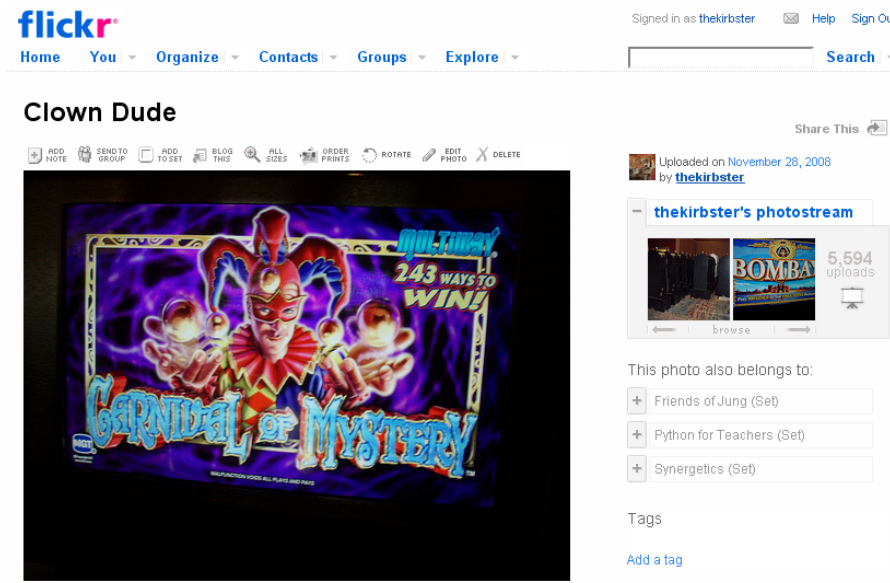
casino gambling

church bingo

facebook / profile / chronofile

learning by playing

Touring facilities...



manga-code: like pseudo-code but it runs... (for simulating the real deal)

```
File Edit Format Run Options Windows Help
"""
Simulation: CSN
Vendor axis fixed:  Mars

Action:  customer selects good, nets bonus to
invest towards worthy cause, with skill level
rewarded (not pure chance), remainder to vendor.
House gets 20% profit (markup).  Vendor gets
demographic data (not shown).  Customer gets
kudos (not shown).  People who just play for
'Me!' all the time will come across as selfish.
"""

from random import randint

house_gains = 0  # Fine Grind

thevendors = {'Mars':0,
              'Red Bull':0,
              'Jack Daniels':0} # technically a "salon"

thecauses = {'GreenPeace':0,
             'MercyCorps':0,
             'USG':0,  # help Uncle Sam sometimes?
             'Me!':0}
```

Ln: 79 Col: 37

<http://mail.python.org/pipermail/edu-sig/2009-June/009405.html>



Runtime... manga code in action, simulating CSN

```
File Edit Shell Debug Options Windows Help
>>>
0 --- Teddy Bear Tilt
1 --- Governorator
2 --- Scary Clown
3 --- No Game

        Whaddya wanna play genius?
        1
0 --- USG
1 --- GreenPeace
2 --- Me!
3 --- MercyCorps

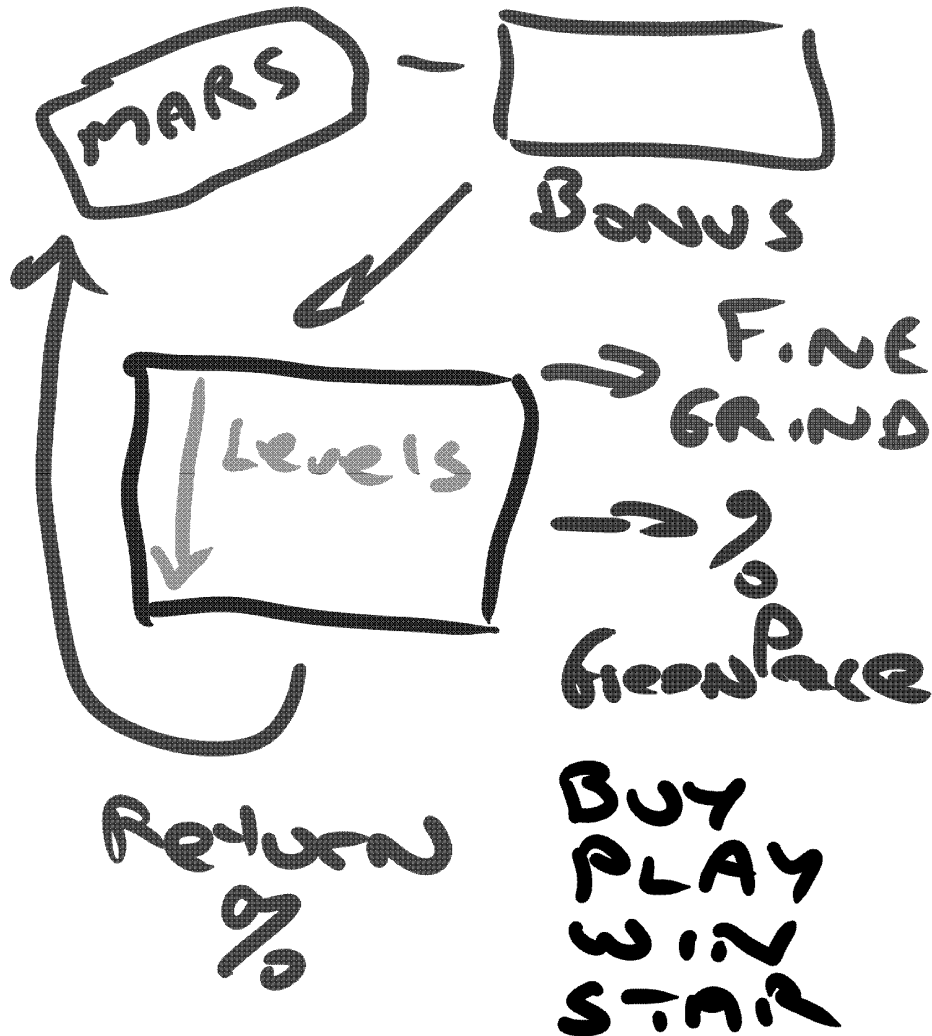
        What do you care about?
        0
Playing... Governorator
Ln: 32 Col: 1
```

“Café Philanthropique”

CSN

Note Title

3/27/2009



Explaining CSN OS to
holdenweb.com on Steve's
IBM thinkpad, Pycon 2009

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File Edit Source Debug Tools Window Help

New Open... Save Save All

Goto Definition Search Run

Break Debug Stop Step Into Step Over Step Out

compose.py kirby/gametest.py oscon/gametest.py perms.py

(top)

```
1 from math import sin
2 import pygame
3 from pygame.locals import *
4
5 if not pygame.font:
6     print 'Warning, fonts disabled'
7
8 if not pygame.mixer:
9     print 'Warning, sound disabled'
10
11 def main():
12     """this function is called when the program starts.
13     it initializes everything it needs, then runs in
14     a loop until the function returns."""
15     #Initialize Everything
16     pygame.init()
17     screen = pygame.display.set_mode((1024, 768))
18     pygame.display.set_caption('Set the Stage')
19     pygame.mouse.set_visible(0)
20
21     #Create The Background
```

Search Stack Data

Search: Replace:

☐ Case sensitive ☐ Whole words ☐ In Selection

Previous Next

Debug I/O Python Shell

Commands execute without Options

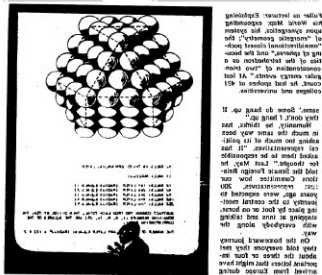
```
Python 2.5.2 (r252:60911, Apr 21 2
GCC 4.2.3 (Ubuntu 4.2.3-2ubuntu
Type "help", "copyright", "credits" or "l
>>>
```

Line 5 Col 20 -

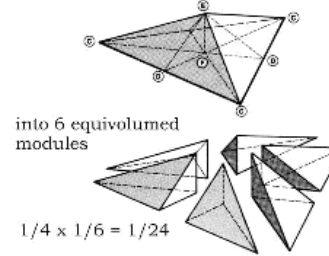
Call Stack Exceptions



Lexical-Graphical Bridge One: Figurate and Polyhedral Number Sequences



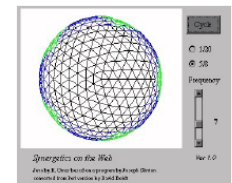
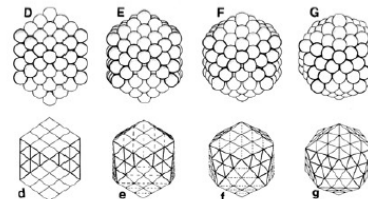
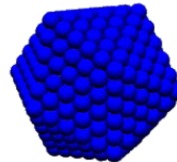
Exploding a Quarter Tet...



Polyhedral Numbers: HP4E Fits Here

```
>>> def icos(f = 1):
    while True:
        if f==1:
            yield 1
        else:
            yield 10 * f ** 2 + 2
        f += 1

>>> icosanumgen = icos()
>>> icosanums = [icosanumgen.next() for i in range(11)]
>>> icosanums
[1, 42, 92, 162, 252, 362, 492, 642, 812, 1002, 1212]
```



string.Template: Mad Libs

```
def poop(self):  
    # kids like scatological stuff  
    # e.g. "grossology"  
    if len(self.stomach)>0:  
        self.stomach.pop(0)    # FIFO
```

The screenshot shows the Powell's.com website. At the top, there's a navigation bar with links for 'HELP', 'YOUR ACCOUNT', 'WISH LIST', and a 'Log In' button. Below this is a 'CART' icon and a 'Checkout' button. The main header features the Powell's.com logo and a 'Sell Us Your Books ONLINE!' banner. A search bar is located on the left. The main content area displays the book 'Fear Factor Mad Libs: Ultimate Gross Out! (Mad Libs)' by Roger Price. To the left of the book, there's a 'RELATED AISLES' section with links to 'Children's Games', 'Children's Activities', 'Mad Libs', 'General', 'Games', and 'Mental Puzzles'. Below that is a 'RECENTLY VIEWED' section showing 'No Items'. The book's cover is visible, showing the title 'Fear factor MAD LIBS Ultimate Gross Out!' and a picture of a bowl of spaghetti.

powell's.com

HELP ♦ YOUR ACCOUNT ♦ WISH LIST

Used Books Textbooks Technical Kids Rare DVDs

Browse Sections • Bestsellers • New Arrivals • Sale • eBooks • Gift Cards

Log In

CART Checkout

Sell Us Your Books ONLINE! CLICK HERE

Picture Books • Middle Readers • Young Adult • Used • Award Winners

SEARCH Advanced Search

RELATED AISLES

- Children's Games
- Children's Activities
- Mad Libs
- General
- Games
- Mental Puzzles

▼ RECENTLY VIEWED

No Items

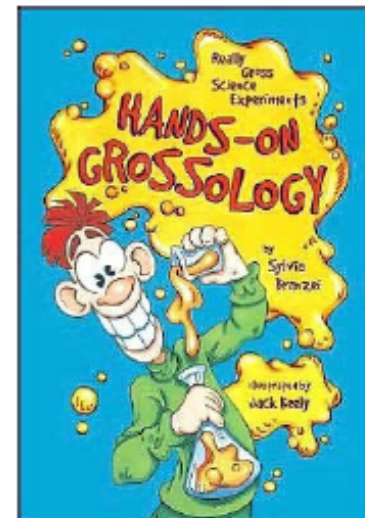
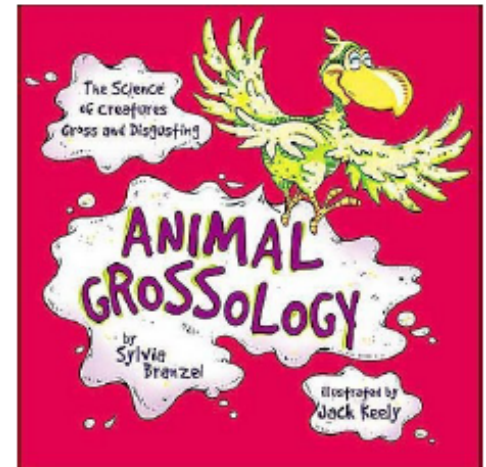
Fear Factor Mad Libs: Ultimate Gross Out! (Mad Libs)
by Roger Price

About This Book

- Synopses & Reviews
- Comment on this title and you could win free books!
- More Books by Roger Price

ISBN13: 9780843111576
ISBN10: 0843111577
All Product Details

World's Greatest Word Game



string.Template: X3D etc.

```
gl_theedge = Template(
    """
    <Transform translation = "$translate">
        <Transform rotation = "$roty">
            <Transform rotation = "$rotx">
                <Shape>
                    <Cylinder height="$length" radius="$radius"
                    containerField="geometry"
                    side="true" solid="true" top="true" />
                    <Appearance>
                        <Material diffuseColor="$color"/>
                    </Appearance>
                </Shape>
            </Transform>
        </Transform>
    </Transform>
    """
)
```

gl_theedge is boilerplate X3D (XML version)

string.Template: X3D etc.

```
edict = dict(  
    radius      = edge.radius,  
    color       = colordict[someobj.ecolor],  
    length      = length,  
    translate   = "%r %r %r" % vrmldata[0],  
    roty        = "0 1 0 %s" % roty,  
    rotx        = "1 0 0 %s" % rotx)  
  
someobj.text = someobj.text + gl_theedge.substitute(edict)
```

edict contains key:value pairs for an X3D Edge

```
testuni.py /home/kirby/testuni.py
File Edit Format Run Options Windows Help

class 艮:

    def __init__(self, 同人):
        self.同人 = 同人

    def __repr__(self):
        return "艮 @ %s" % str(id(self))

Ln: 5 Col: 0

IDLE 3.0a2
>>> from testuni import 艮
>>> themountain = 艮("Fuji")
>>> themountain
艮 @ 138188876
>>> themountain.同人
'Fuji'
>>>

Ln: 19 Col: 4
```


Programming for Everybody (P4E)

- Guido, IDLE and the .mil sector (CP4E)
- Add-ons from the .edu sector (e.g. VPython)
- Edu-sig archive at Python.org
- M. Shuttleworth matrix (kusasa.org etc.)
- A. Kay matrix (Dynabook, OLPC etc.)
- K. Urner matrix (HP4E etc.)
- A. Siegel matrix (Pygeo etc.)
- ... and so on (every “gnu math teacher” gets a “matrix” and applies a “spin” – KU’s namespace)

SUMMER OF 2007: Europython, Vilnius, Lithuania

Using Python generators: A007318, A00217, A00292 (OEIS)

File Edit Format Run Options Windows

Help

```
def pascal():
    """Generate successive rows of Pascal's Triangle
    http://www.research.att.com/~njas/sequences/A007318
    """
    row = [1]
    while True:
        yield row
        row = [ i + j for i,j in zip([0]+row, row+[0]) ]

def triseq():
    """Read triangular numbers from Pascal's Triangle
    http://www.research.att.com/~njas/sequences/A000217
    """
    pg = pascal()
    next(pg);next(pg) # skip first two rows
    while True:
        yield next(pg)[2]

def tetraseq():
    """Read tetrahedral numbers from Pascals Triangle
    http://www.research.att.com/~njas/sequences/A000292
    """
    pg = pascal()
    next(pg);next(pg);next(pg) # skip first three rows
    while True:
        yield next(pg)[3]
```

Lightning Talk Version

- [0] title and opening credits
- [1] the geography in question
 - (like a videogame, like *Uru* by Cyan of Spokane)
- [2] blasting a new track (Max tunnel metaphors)
- [3] light at the end of the tunnel
 - (sweet jobs in the Silicon Forest)
- [4] on the ground (math wars R us)
- [5] marketing strategies (private industry mulls 'em over)
- [6] quick trip through some math topics in Python (yawn)
- [7] recap of core strategies, "takeover" of PPS (willing recruits model, merit paid elite crew)
- [8] FOSS in Culture
 - (generic themes relevant to the conference)
- [9] closing credits, 4D Solutions logo



Get Involved!



$$\frac{1}{\pi} = \frac{\sqrt{8}}{9801} \sum_{n=0}^{\infty} \frac{(4n)!}{(n!)^4} \times \frac{26390n + 1103}{396^{4n}}$$



**American Friends
Service Committee**

Quaker values in action



Lightning Talk Version

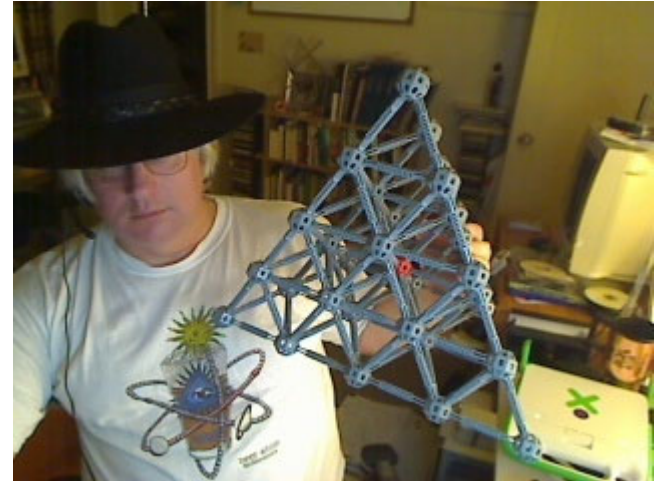
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Questions?



Kirby Urner

Kirby Urner, with a BA in philosophy from Princeton University, is a computer programmer and educator. He has developed computer literacy products for McGraw-Hill and is a former high school mathematics teacher.



Thank You! Be in touch: 4dsolutions.net